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ABSTRACT

Intended for school administrators, educators, and the lay public, this publication describes five innovative and effective vocational education programs developed with support from the U.S. Office of Education in response to a local problem. The programs, each requiring the coordinated effort of community groups and leaders are: (1) Industrial Arts Curriculum Project, which has been responsible for implementing a 2-year industrial arts curriculum emphasizing theory, operation, and necessity of modern production methods in more than 300 schools in all 50 states, (2) a vocational home economics course for disadvantaged youth that emphasizes preparation for the dual role of wage earner and homemaker, (3) the Work Opportunity Center which provides job skills and basic education and personal development training for dropouts and potential dropouts, (4) Project ABLE which is an individualized instructional system that allows the student to move from one skill level to the next at his own pace, and (5) an experiment which demonstrated that U.S. Air Force courses and teaching materials could be adopted to the public school system. (SB)

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New Thrusts in Vocational Education

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New Thrusts in Vocational Education

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Foreword

One of the keys to educational progress is educational research and development, plus the related activities of evaluation, demonstration, and dissemination.

This publication describes five innovative and effective vocational education programs that have been developed with support from the U.S. Office of Education. They are but a sample of many worthy educational efforts under way across the country to improve occupational, vocational, and technical education.

Each program represents a response to a local problem. Each required the coordinated effort of many diverse community groups and leaders. Each has been subjected to repeated validation and evaluation before reaching the present level of refinement.

It is our expectation that the programs described in this publication will help school administrators, educators, and the lay public with ideas and models for initiating further improvements in vocational-technical education programs. For readers wanting more specific information, the names and addresses of the leaders of the programs are described within the articles. Additional information may be obtained by writing to the National Center for Educational Research and Development.

March 1971

Robert E. Pruitt
Director, Division of Comprehensive
and Vocational Education Research

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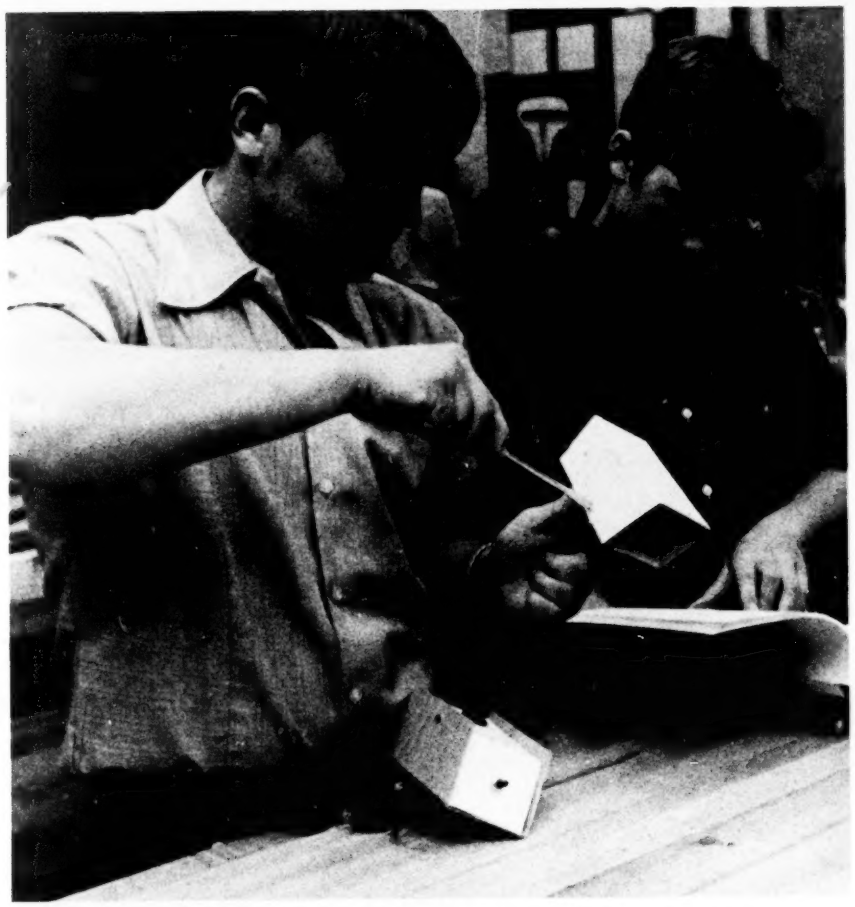
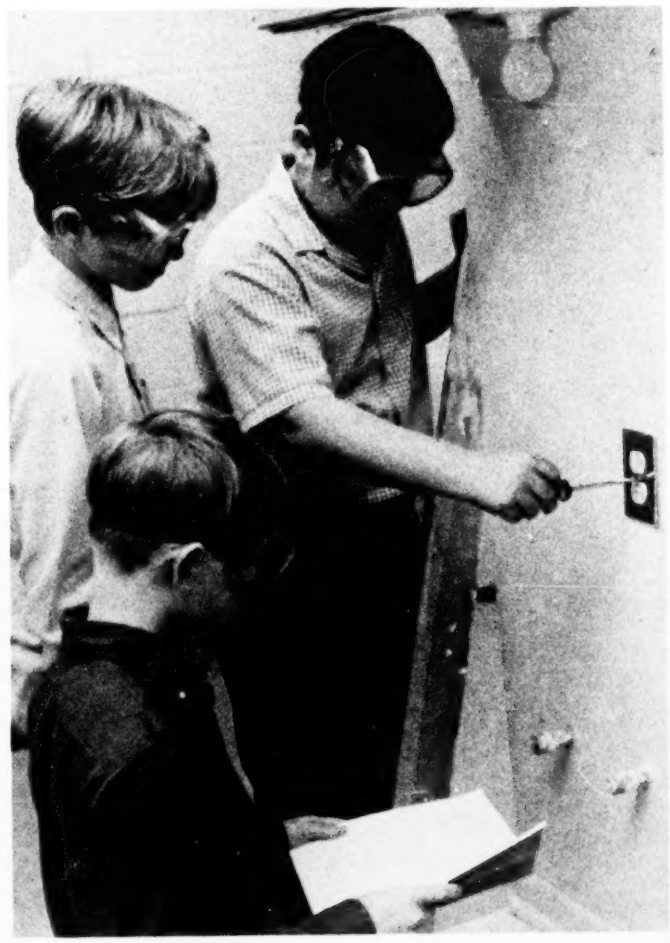
A WORKING LABORATORY FOR TODAY'S YOUTH





Industrial arts classes in junior high schools can be an exciting laboratory of today's workaday world. And something definite is being done to make them that way—the U.S. Office of Education-supported Industrial Arts Curriculum Project (IACP) headquartered in Ohio State University.

As a result of that project, which began in 1965 and has since been adopted in more than 300 schools in all 50 States, look what's happening.

- In Long Beach, Calif., five 7th-grade boys work as a team to mix concrete and then pour it into wooden forms they have built to start their classroom construction project.
- Students in a Newark, N.J., industrial arts class draw up plans for their dream house, which they will later build to precise scale out of quarter-inch thick sheets of styrofoam.
- Boys in a Richmond, Va., classroom learn house wiring as part of their building project, and a mother of one of them drops by the school to tell the teacher proudly that her son has fixed the broken lamps at home and is now repairing the porch. "If they learn to do things like that in school, you can raise taxes all you want to," she says.
- In Cincinnati, Ohio, a production line has been set up and 8th-graders are manufacturing high-intensity desk lamps.
- In a Chicago classroom, a simulated jurisdictional labor dispute has cropped up. One of the students, acting as the labor union representative, must decide whether or not to call in an arbitrator.
- In Dade County, Fla., the industrial arts class is discussing the environment and regional planning. One youngster raises a hand and asks, "Why do people have to live in rickety houses when new ones should be built?"
- In Fort Worth, Tex., boys visit a downtown construction site after school and watch a huge crane lift steel girders into place so they can be fastened by work crews. In school the next day, the same students talk about what they saw and relate it to their own classroom project and use of a jenny winch boom.

If these events sound vastly different from the traditional industrial arts course of making bookends and copper ashtrays, and admonitions from the teacher to "tend to your sandpapering and shut up," it's because the IACP program was intended to do just that.

Although it has been out of the research stage and into the classroom only a relatively short time, its impact has been impressive.

"I don't have to yell at the boys to be quiet. They walk in the door—full of business and ready to go," remarks an Ohio industrial arts teacher with more than 20 years' experience. Industry, business, and trade unions have lauded the new curriculum for its relevance to today's world. In a number of cities, building trades unions have provided both materials and talent toward making the course a success. Business has also pitched in with money for the purchase of equipment and materials.

"Until this project was implemented, there was really no mechanism within junior high schools in the United States to furnish students with knowledge of the real nature of industry and so to prepare them for real life in a world in which industry is a major factor," says the owner of a Cincinnati milling machine company.

An executive of the Western Electric Co., who observed the IACP program in action in Newark, notes that the city's school system, like most urban school systems, "exists in extensive isolation, resulting from years of neglect by various segments of the community, and the IACP program helps to bridge this school-community isolation gap . . . ."

The same idea is expressed by a Los Angeles industrial consultant: "The new curriculum . . . can introduce young men to realistic concepts of the working world, expose them to career objectives, and develop success symbols that identify with a good education, whether it ends in the 12th grade or is continued afterward."

For a society that puts a high priority on college attendance and white-collar jobs, the IACP program, in the words of a Cleveland labor leader, "may help to break down the social stigma against vitally essential manual skills and the look-down-the-nose attitude at people who make a living by working with their hands."

Invariably the introduction of the program in selected schools during the developmental period was an immediate outpouring of com-

munity support and cooperation. In some cases, this included financial and material help.

Under a vocational education research grant from the Office of Education, the IACP program was created in 1965 by a group of educators from Ohio State University and the University of Illinois in cooperation with the Cincinnati Public Schools.

Its codirectors, Dr. Donald G. Lux and Dr. Willis E. Ray, based at Ohio State University (1712 Neil Avenue, Columbus, Ohio 43210), set up six field evaluation centers and seven demonstration centers to evaluate, monitor, and teach the use of IACP materials. Experts of every kind—from child psychologists to top government leaders—were tapped for ideas and suggestions in the task of developing a 2-year curriculum that was in tune with modern industrial technology and in step with today's youth.

The 1st-year course, called The World of Construction, began field tests in a handful of schools in the Midwest in 1967. More than 15,000 students completed the course during its first 3 years of classroom laboratory development. The 2d-year course, The World of Manufacturing, was developed as a sequel to The World of Construction. It took the students another step along the way toward understanding the theory, practical operation, and necessity of modern methods of production. The World of Manufacturing is now being introduced in various secondary schools around the country.

In sharp contrast to the more conventional industrial arts course in which the student works alone, the IACP curriculum takes a broader tack. The student may work as a member of a five-man team. A single project may involve an entire class. The individual student, at the same time, has ample opportunity to "do his own thing." He designs and builds his dream house. But even that house, as the course is taught, is part of a neighborhood which, in turn, is part of a larger community. It is seen as a house within the framework of our society.

The construction course provides reading materials and units of study that extend over an average 185-day school year, with leeway left for filmstrips, class discussions, guest speakers, and possible field trips. The basic textbook and materials developed for The World of Construction are now available (McKnight & McKnight Publishing Co., Bloomington, Ind.) and contain 97 short chapters, all well illustrated. Hardware and expendable materials have also been commercially packaged and are available. Course study units move the student through planning, technology, and management.

In practice, in a typical classroom—whether it is in Ohio, Michigan, or Washington State—here's how it works.

The student begins where a home builder begins. He must purchase land, then survey, clear, and grade it in preparation for developing. Sand boxes are used for this instruction. The students are divided into five-member work gangs, with each member assigned to a specific job. There's a foreman, an equipment supervisor, a timekeeper, a grievance man or union representative, and a supply foreman. The assignments may be rotated during the project

The project itself involves constructing an actual corner of a house, measuring 4 feet wide by 4 feet high. Concrete footings are poured. The concrete work, wood framing, flooring, plumbing, insulation, siding, heating and cooling ducts, electrical components, and roofing are installed, step by step, following the textbook. The teacher's role becomes that of an advisor, although the class is called together for discussions.

When the project is completed, the "house" is sold. Students thus find out how deeds and titles to property are transferred. Then the project is dismantled. Teachers report that about two-thirds of the materials may be salvaged and used over again.

The student's final project is to design the dream house he would someday like to live in.

"It's interesting what the students come up with," says a veteran teacher in a New Jersey school. "In the suburbs, they are on the conservative side. They build ranchers, split levels, colonials, like the homes they live in. In the inner city, the boys come up with really far-out designs. Some of their houses are round, some stand up on pillars—you get everything, and they're good, too."

In the second year, in The World of Manu-

facturing, students learn how products are created, produced, packaged, and marketed by a modern industrial plant.

Their classroom projects, built on production and assembly lines that they devise, include a small wooden rocket, a 10-inch wooden vehicle powered with a carbon dioxide cartridge (the boys hold races with these), wooden salt and pepper shakers, a buzzer burglar alarm, plastic house numbers, and a screwdriver with a plastic handle. For the final project, all the skills and knowledge the students have acquired are brought together in the production of high-intensity desk lamps. Most boys wind up taking their lamps home, but some choose to sell them, and make a good profit.

How much does it cost a school to install and operate the IACP curriculum in place of the usual industrial arts shop?

The cost is minimal. The official estimate runs about $40 per student for the 1st year and $10 per student in subsequent years. The estimate is based on five classes of 25 students, or a total of 125 students taking the course in school.

Actual costs, however, tend to vary from school to school, depending on the equipment and materials already available. A Newark teacher, for example, reports that his overall expenditure when he introduced the construction course ran under $300.

"We had sabre-saws and electric drills, and that's about all the power tools that you need," he explains. "I use just one workbench. For extra work space, we put a sheet of heavy plywood over a couple of sawhorses. Once the building work starts, these can be moved around the room to where they are needed. The important thing is to keep classroom space open and flexible."

The IACP program puts emphasis on teacher training. With the help of the U.S. Office of Education grants, more than 400 industrial arts teachers have attended special IACP training workshops on various college campuses. Other workshops are scheduled.

The teachers readily admit that the program is far more demanding than traditional industrial art courses. But, as one teacher says, "When the kids come to you after class and beg to attend school on Saturday so they can work on their projects, then you know something is right."

VOCATIONAL HOME ECONOMICS

The place: A home economics class in an inner city, urban high school.

The students: All are from deprived backgrounds, and nearly all are classified by the school as potential dropouts. Girls make up most of the class.

The teacher: A veteran home economics teacher.

The program: A new kind of vocational course in home economics developed under a research grant from the U.S. Office of Education.

The students are seated in a semicircle facing the blackboard where the teacher, Mrs. Temple, is standing. The atmosphere in the classroom is not exactly hostile, although it was definitely that during the first few days. School has been an alien experience for most of these young people, whose real education has been in the streets of the city. With the class in its 2d week, the students know that it's not the standard home economics course of learning to make cinnamon toast and brownies and sew an apron. The questions are in their faces: Is the teacher sincere? Does she really care what happens to them?

The questions, unusual for the average home economics course, were prompted by the discussions the class had had about goals in life and the meaning of honesty, responsibility, and trust.

The free give-and-take discussions — "rap sessions" as the students call them—were a new and refreshing experience for a home economics class. Mrs. Temple at one point posed the question, "If you had a choice, if there was one thing that you wanted out of life, what would it be?" She asked them to write an answer, but not sign the paper, and hand it in.

One girl giggled, self-consciously.

"You mean what we really want?" another girl asked.

Another girl raised her hand, but couldn't get the question out.

Some of the students, writing on the paper in front of them, bent over and cupped their hands over the paper so their neighbors couldn't see what they were writing.

Three girls couldn't make up their minds.

When the teacher had the papers on her desk, she went to the blackboard and began putting down the replies given by the students, The class watched each word, expectantly.

"New car."

". . . to be rich."

"A house to live in."

"Happiness."

"Red bicycle."

". . . bag of money."

"New clothes."

"Happy marriage."

By the time the last word was on the blackboard, the mood of the class was boisterous. Then the teacher raised another question, and everyone was asked to think the answer over carefully this time. She asked, "When you wrote down what you wanted, were you really being honest with yourself? Was that really it?"

For the rest of the 1-hour period, and for 2 days afterward, the students mulled the question over and talked it out in class, and everyone had a say.

Mrs. Temple gradually worked some "ground rules" into the discussions between herself and the students, and among the students themselves. For example, it was understood that nobody was to be laughed at, no matter what was said. It was also agreed that anything said in the classroom wasn't to be repeated outside. The "ground rules" as they emerged during the first 2 weeks set the tone of the class for the balance of the year. The key was a mutual trust between teacher and students.

The course was on track, exactly as planned.

It was moving toward its goal, as stated by the educators who developed it, of helping "young men and women take their places in the adult world as homemakers and wage earners."

The events described in the classroom could have taken place at any one of 12 inner-city high schools in the four States where the new home economics curriculum was put to the test over a 1-year period with Office of Education support.

That the curriculum broke new ground in the home economics field and earned the warm plaudits of its students was a conclusion reached by all of the teachers who saw the course through its experimental development.

The project got under way in 1967 as the

result of an urgent need recognized by three home economists and researchers—Dr. Phyllis K. Lowe, of Purdue University; Dr. Julia I. Dalrymple, of Ohio State University; and Dr. Helen Y. Nelson, of Cornell University—to square the teaching of home economics in high schools with the realities of family life in 20th century America. They noted that working women are an accepted part of today's labor force, and that studies by the U.S. Department of Labor showed that better than half of the Nation's women hold jobs outside the home. Moreover, this percentage is rising steadily. They also noted that, for most families, the income of a working wife has become a virtual necessity.

"We felt there was too much stitching and stirring in home economics and something ought to be done to change it," said Dr. Lowe. "We also decided to focus our attention on the disadvantaged where, we felt, the change was perhaps needed the most. Our target became the potential dropout in the inner city. We felt we somehow had to reach that student before she left, and try to provide her with some basic skills in living and working.

With Office of Education support, the 3-year project got under way. Vocational experts from the Office provided advice and guidance when it was needed.

The new curriculum that gradually took shape divided the student's year into four parts:

- Skills for living, which focused on the individual and human needs.
- Introduction to skills for employment in food service, which taught specific job skills and positive job attitudes.
- Skills for homemaking, which examined the family, the community, and society. Included was a major unit on sex education.
- Management as a working homemaker, which promoted skills in home planning, management of time and money, and consumer education.

The curriculum made use of classroom games, field trips, outside speakers, brief psychodramas acted out by the students, slides and films, and bulletin boards. Written work was minimal, but stress was placed on classroom discussion. There was no cookie-making or sewing. In fact, the course didn't require a single stove or sewing machine.

Outside employment was also an important part of the curriculum. The job went hand in hand with learning food service skills. It was the responsibility of the teacher to contact potential outside employers and then place the students in jobs. Teachers were given time off from their regular day for this field work.

The new curriculum was set for field testing at selected high schools in Indiana, Connecticut, New York, and Ohio. While the formal title of the course was "Preparation for a Dual Role: Homemaker-Wage Earner," it was given various names at the schools. One called it "Effective Living," another "Occupational Foods," another "Psychology for Living," and still another "Getting Ready for the World of Work." The participating teachers, ranging from new teachers to those with many years of experience, met in a 2-week workshop before taking the curriculum back to their schools. That was during the 1968–69 school year.

For all of the teachers, the year proved to be an exciting one.

"I couldn't be more enthusiastic about the course," sums up Mrs. Donna Gollnick, a young teacher who is still using a part of the course at Washington High School in South Bend, Ind.

Miss Lauretta Hubertz, a teacher with 40 years' experience at Central High School in South Bend, has similar praise. "It made sense," she says.

"For these kids, life is real and it is now. One thing I have to admit—it was tough getting started. The students walk in that door with you-don't-know-what experiences in their backgrounds. It took a while, but once they started to open up, they were great."

She adds that nearly all of her students went on to finish high school and that a number are still working at the same jobs in which they were placed. And there are some "who still come back to jaw with me as a friend."

Mrs. Inez Maloney, a teacher at Marion-Franklin High School in Columbus, Ohio, observes that the girls she had in the original experimental class still talk about it as the best time they ever had in school.

"It obviously really had an impact because so many of them have come back since to talk

with me. They tell me what they're doing, and what their friends are doing. I think that almost every one of them went on to finish high school."

Mrs. Maloney adds, "I don't know whether it was the material or the unusual closeness of the group, but I suspect that it was both."

Mrs. Mary Reardon, a teacher at George Washington High School in Indianapolis, Ind., notes that "setting the ground rules" during the course's first few weeks gave her "genuine rapport" with her students.

"I had 17 girls and three boys that year," she explains. "I think the course was tremendous. We used bulletin boards, games, case studies, films, and speakers. We had 1-minute dramas which the students would act out. It could be a family situation, or what happened at lunch time, or just before class. We also had role-playing—that is, some students would pretend to be in a restaurant, and then they would get served. It was a good year, all in all. Yes, they still drop by to see me once in a while."

Similar experiences are reported by other teachers involved in the project. Mrs. Mabel Cox at Roosevelt High School in Gary, Ind., Mrs. Barbara H. Buxton at Central High School in Bridegport, Conn., and Mrs. Bertha B. Meyer at Riverside High School in Buffalo, N.Y., are uniformly "enthusiastic."

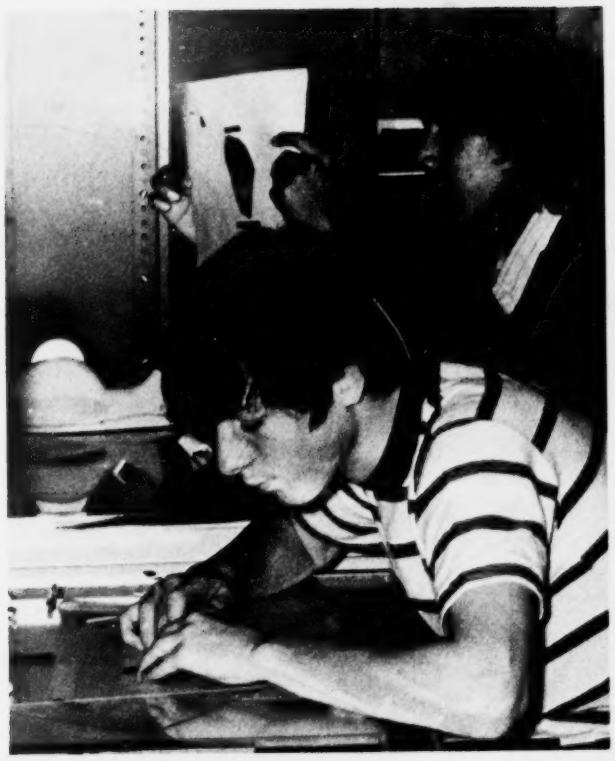
The teachers also generally agree that most home economics teachers could handle the course.

The participating teachers were brought together for a repeat workshop after the field test to suggest modifications and additions to the curriculum. All of these were incorporated into the finished product.

The curriculum project is already making ripples in the high school home economics field, and promises to make even more. The three researchers who developed the project have been hearing from school systems from all over the country since final preparation of the curriculum guide.

"We're amazed at the number of letters we've received from schools that are interested in trying it out," says Dr. Lowe.

TURNING DROPOUTS ON—TO EDUCATION



For looks, the Work Opportunity Center, housed in a 1920's-style Tudor structure just three blocks from the loop area in downtown Minneapolis, Minn., isn't much. The red brick of the building, which was formerly a Masonic hall, has faded and, together with the ornate stonework and ceramic designs around the entrance, has absorbed the grime of the city over the years.

It looks like anything but a school. But that is because it was intended that way.

Young people who quit, are rejected, or otherwise can't make it in the city's conventional secondary schools are making it big at "The WOC" (pronounced Wock), as they have come to know the unique vocational institution which is part of the Minneapolis public school system.

WOC students retain "membership" in their "home" high school. Approximately 85 percent of the dropouts who go all the way through WOC return to and graduate from their "home" high school.

The Center, at 107 SE. Fourth Street, has proven eminently successful in "turning on" dropouts and potential dropouts to the meaning and merits of receiving an education and training.

"Our success stories with youngsters could fill a book," notes Sterling Patterson, industrial arts consultant for the Minneapolis Public Schools. "That has been more important to us than the awards the project has won."

Since it was started in May 1966, with a vocational education research grant from the Office of Education, the Center has provided job skills and basic education and personal development training to thousands of students. Most of its "graduates" have gone on to jobs and lives as productive citizens. Some have even made it to college. The attachment students feel toward the school is reflected in the fact that many come back to visit after graduating.

"So many of these kids have told us that the WOC is where school started to make sense for them," commented John Nagle, a guidance counselor at the Center with 20 years' experience as a teacher.

Dr. Michael P. Joseph, WOC's director, puts it another way. "The students come because they want to come. They genuinely want to learn . . . ."

For the high school dropout on the streets, who has heard about the Center from a friend or one of the WOC's staff social workers, that first voluntary step toward enrollment takes more than just mental effort. The small handmade sign near the front door says, "New Students Enter Here." From that point, it's a four-flight walkup to the registration area.

There, one small and cautious step at a time, an effort is made to involve the youthful applicant in the program and activities of the Center. The forms and paperwork are left until later when the student is ready for them. Usually, in fact, once the youth has met a teacher or two, or had a look at one of the shops, or had lunch with a counselor in the basement cafeteria, he asks the question himself, "Where do I sign up?"

"When he gives the sign, we know that we have him," says Mr. Nagle.

Then it is simply a matter of the youth's sitting down with one of the staff counselors and making up his schedule of courses. His options are wide. He can come an hour a day, for 2 or 3 hours, or stay the whole day. If he has a difficult time waking up in the morning, which may be the reason why he quit school, then he can start school at noon or later. Since the student moves at his own pace, he is free to enter a course at any time during the year. There are no regular semesters. The WOC, moreover, is open 12 months of the year, closing only briefly for the main holidays.

The students earn regular credits for their courses and these may be applied toward obtaining a high school diploma. Grading is pass-fail, but nobody ever fails. Projects may simply take longer for some students than they do for others. The stress is always on completing the project. For the student branded as a "reject" by the conventional school system, this measure of success, however small, becomes vitally important. It is a buildingblock toward developing a better self-image and personal competence.

The Work Opportunity Center enrolls young men and women, ages 16 to 21, who are either dropouts or potential dropouts from the city's schools. The students generally come from

working-class backgrounds, although some are from middle-class families. About half come from homes where the parents are divorced or separated. About 20 percent come from black or minority-group families.

In the physical checkups given as part of the enrollment procedure, the Center finds that about 90 percent of the youths have some sort of physical impediment, and about 40 percent have an actual physical handicap. Subsequent medical treatment is provided to those who need it under the project. One 16-year-old girl, for example, was found with a malignant tumor. She was operated on, the tumor was removed and she is now happily married and working at a trade she learned at the Center.

Dr. Charles E. Nichols, WOC's director during its first 3 years, remembers that it was rough going for the project at the start.

"We wanted to try something that hadn't been done before, so we threw out the book and wrote a new one. We wanted to establish a school that, first of all, didn't look like any other school and, secondly, that had none of the same routines.

"We found what we wanted in the old Masonic building. It had a central location and there were no other schools close by. When we had it remodeled inside, we made sure that it didn't resemble a school. In fact, we didn't have classrooms. We called them areas. There were no teachers. We had instructors," Dr. Nichols explains.

The general shop area on the building's fourth floor—for instruction in electronics and electricity, small-engine repair, and machine work—was laid out to resemble a factory. The training area for office skills on the third floor was made to look like a regular business office. Informal instructional areas for English, math, and the social sciences were set up on the second floor, along with areas for sewing, home economics, health care, personal improvement, creative art, marketing, and merchandising.

There is also a place for showing films and a student lounge, a complete drycleaning plant, a teachers' lounge, and staff offices. The basement houses the kitchen and cafeteria, both of which are used in food service training.

In addition, the Center leased an auto service station about a mile away to train boys in jobs in auto mechanics and servicing. It is operated by a professional manager hired by the Center as a profitmaking enterprise, and it has paid its way, and more, from the beginning.

"Since our student body was going to be made up of dropouts, some of them with jail records, we thought we were going to have trouble recruiting teachers," said Dr. Nichols.

As it turned out, however, the opposite happened.

"We had 75 applicants from the Minneapolis schools for 19 teaching jobs. We also took on people who had never taught before, and they all worked out great as teachers. There was a cook, a cleaning plant manager, a service station manager, and a machinist, and the kids really related to them."

"It is the job of our teachers to reach the students. It is not an arm-around-the-shoulder approach but rather a good, solid instructional approach, one adult to another," Dr. Nichols explains.

"Our teachers found that they had to work a lot harder than before. We even sent some of them back to night school to brush up on their skills. But nobody seemed to mind because the job was so rewarding. Some of those kids—you could see the change for the better, literally, from one day to the next."

Today, every one of the school's approximately 50 professional staff members is a state-certified vocational educator.

The Center took on students slowly—only a dozen when its doors first opened. The number swelled gradually as the word on the WOC got around, reaching a high of 437 students at one point. It now averages about 300 students at any given time.

The atmosphere at the Center is relaxed, but purposeful. Students know what they want and they are eager to learn. Although rules and regulations are virtually nil, discipline is no problem and there is no vandalism. No school bells ring marching orders. Students follow in an individualized program of training and study. They may remain in a class for 10 minutes, or an hour, or all day. Attendance usually averages 80 percent. For the mere act of going to class, a student earns a coupon worth 10 cents. It is redeemable in the cafeteria, for drycleaning services, or for gasoline or auto

services at the school-run auto service station. Students also earn coupons for classwork.

To provide further incentives to students in their work and in developing positive attitudes, the Center holds regular art shows where student work is publicly exhibited. Bulletin boards on every floor record student progress. Pictures made by a school-owned camera tell the story.

Students are encouraged to bring their own radios, or bicycles, or cars to school for use in demonstrating operation and repair. Teachers agree that this is quite an incentive.

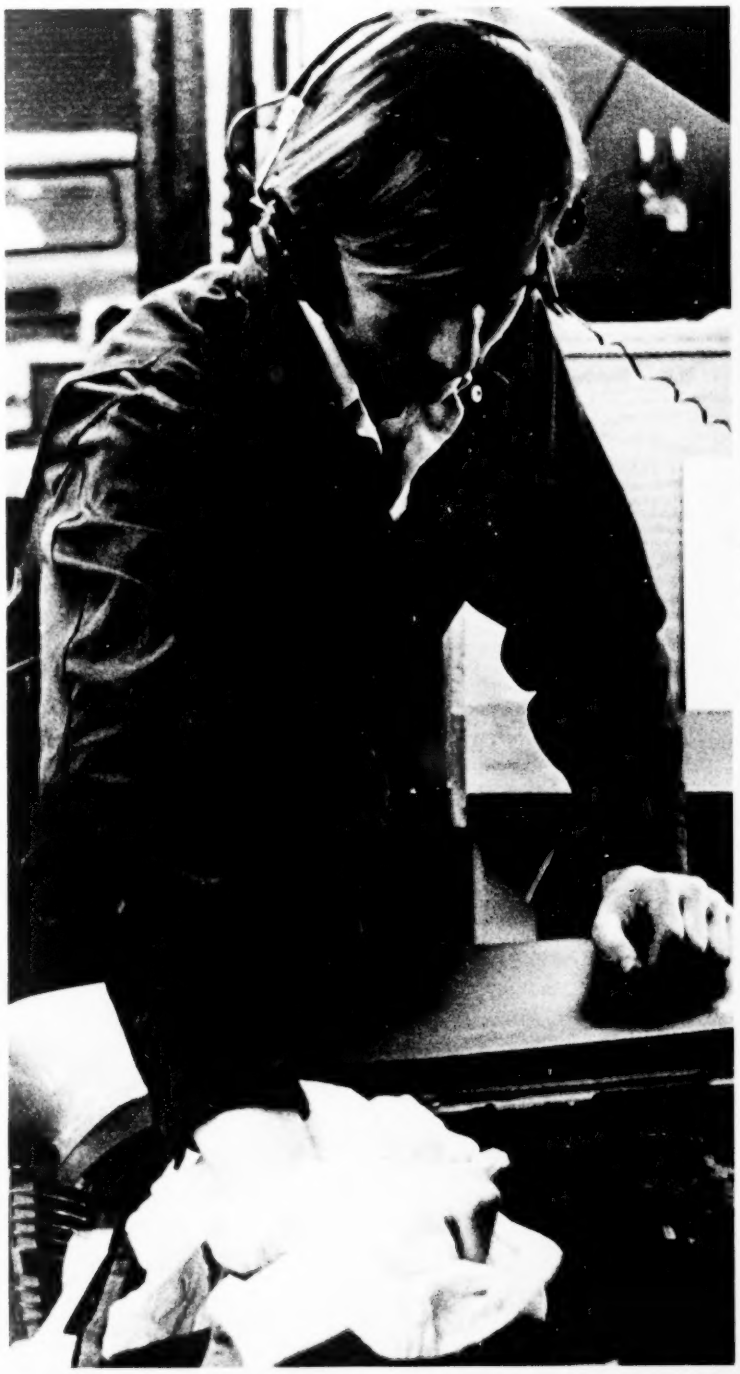
The WOC also provides a free lending library replete with magazines and paperbacks. Students can keep books, mark them up if they want to, for use in classroom discussions. The publications are purchased by the Center with money that normally would go to pay a librarian. The teachers report that most of the books are read and returned. Dr. Nichols recalls that during his 3 years on the project not a single book was ever found mutilated or tossed into a trash can. He said that once a busdriver came in to complain that students were so busy reading that they were bumping into people getting on and off the bus. "We relish complaints like that," he adds.

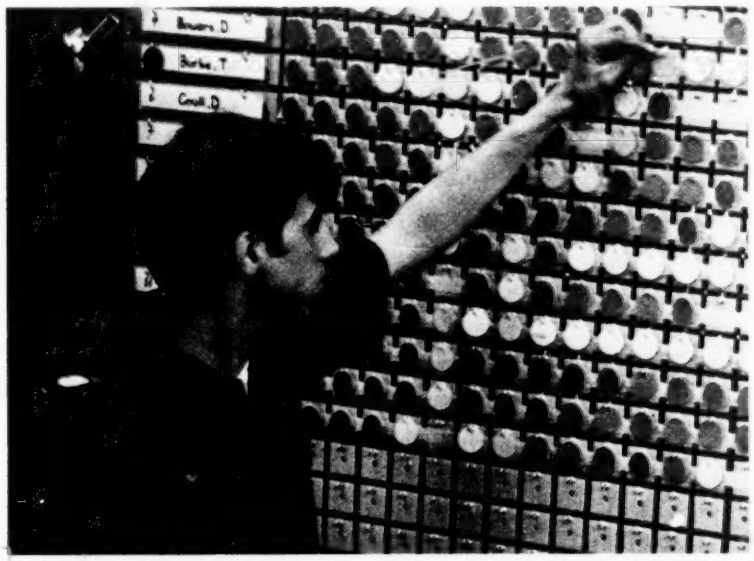
The Office of Education-initiated project is now entirely funded through State and local revenue sources. Its accomplishments have been notable.

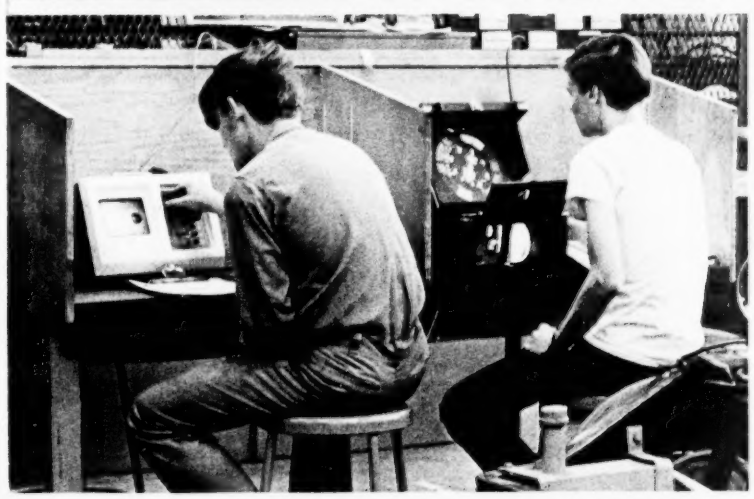
- Creative innovations in curriculum have been tried out and evaluated.
- The project shows that teacher performance, not just student performance, is vital to an effectively operating school.
- More than 3,500 problem youths have benefited from the Center's programs and activities. Their response has generally been positive. The strong personal counseling program and individual approach to learning remind students every day that the Center's staff cares about them. And if the students know that others care, then they care, too.
- Potential dropouts spotted at the junior high level where, according to Dr. Joseph, the real trouble starts, are now participating in the WOC program for part of the day. This is the part of a new dropout-prevention effort in the city.
- The WOC has shown that with planning and imagination a program can be developed that turns dropouts and potential dropouts on to the values of education and training.

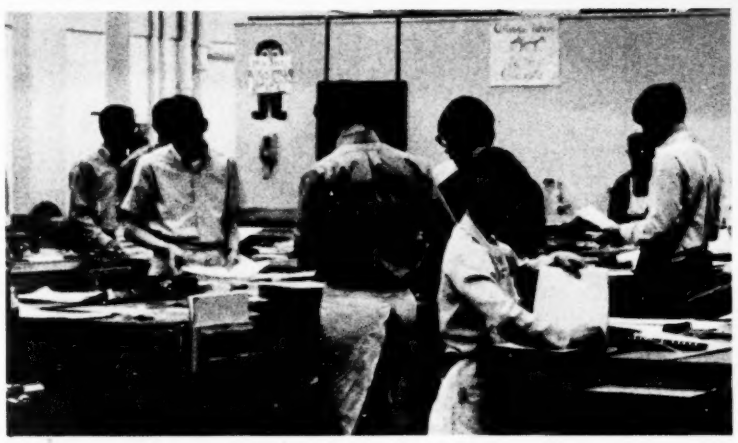
"What is working for us may not necessarily work in other cities," says WOC's director, Dr. Joseph, "but we think that we have something to contribute."

PROJECT ABLE—A SHOWCASE FOR EDUCATORS









The Quincy Vocational-Technical School is one of the showcase schools of the Quincy, Mass., public school system. Opened in the fall of 1967, it is a modern, four-level structure containing 235,000 square feet of space, and it is joined to "twin" academic Quincy High School next door by an enclosed bridge that draws heavy student traffic. The interior design is open and flexible.

But for the more than 400 educators from all parts of the United States and abroad who come to observe the school during an average year, the school's physical plant, while unique in many ways, isn't the real purpose for their visit. As one recent visitor put it, "More than the bricks and mortar, we're interested in what is going on inside."

The main attraction at the school, for most of the visitors at least, is an experimental, student-controlled curriculum created as the result of a vocational research grant from the U.S. Office of Education. Some segments of the curriculum development project, known as Project ABLE, have been completed after extensive field testing and refinement, while other segments are still under development. But the feeling of those involved in Project ABLE, a joint research project of the Quincy Public Schools and American Institutes of Research, is that its potential for bringing relevant change to vocational education generally is tremendous.

The project, in a nutshell, is an individualized instructional system that allows the student to move along from one skill level to the next at his own pace, like climbing a stepladder. Starting with the simple and practical, the student moves gradually along toward more complex and theoretical problems and challenges.

Each rung of the ladder represents a basic skill-and-knowledge achievement level that enables a student to qualify for a job. The more rungs that he advances, the broader are his skills and knowledge. As he progresses from one achievement level to the next, he's able to qualify for a better job. Presumably, at the top of the ladder he could enter a college or university to advance his technical education still further.

As the student progresses, moreover, he also receives personal guidance and counseling both from the teachers and from specially trained counselors. This is built right into the program. The student may receive help in career selection or in finding a job when he graduates at the skill-level attained in his Project ABLE courses. He receives similar help in finding a job if he's forced, for personal reasons, to drop out of school.

William Ullery, who directed Project ABLE through its later stages, explains that the project's goal is to put many doors, or options, in front of every student, and then let the student take it from there. The incentive is real—the promise of a more skilled, better paying job. Mr. Ullery notes that students tend to advance quite rapidly once a course starts, following both their interests and their ability.

Glen Neifing, a consultant to the Quincy vocational schools who was a member of the Project ABLE research team, observes that "it's a rare student that doesn't take the bit between his teeth."

Discipline in the classroom has never been a problem, according to Mr. Neifing, and the dropout rate has fallen sharply.

"With the program tied to specific occupational skills in the economy of Quincy and surrounding communities, the students see clear purpose in what they're doing. It makes sense for them and they respond," explains Mr. Neifing.

The program has also proved a boon to vocational and industrial arts teachers concerned about what happens to students after they finish high school, and particularly if a student leaves school before graduating. Students who remain even part of a year may leave with basic job skills. The achievement rungs he attains in the course up to the time he quits school represent standard, accepted credentials in the job market.

Project ABLE could have happened in most any urban community in the United States. But its origin in Quincy, an industrial city with a population of about 90,000 people located south of Boston, has provided an especially fertile laboratory for testing the program.

During the early 1960's Quincy was wrestling with serious problems of overcrowding in its two large academic high schools and one small, poorly equipped trade school. The city fathers agreed that a new high school was

needed, but the question was what kind. Studies at the time showed that only 30 percent of the high school graduates entered college, and another 15 percent were going on to some kind of technical or vocational school. When funds became available to build a secondary school, it was decided that it should be a vocational-technical school. Project ABLE was born out of the discussions of what should go "inside" the new school.

"There were no simple answers to the problem," recalls Robert Pruitt, who was superintendent of schools in Quincy at the time. "We looked for help from the colleges, but they weren't too interested. Looking around at other vocational schools, we found them struggling along with programs and techniques dating back 50 years. We had to make a fresh start, and our vehicle for doing it became Project ABLE."

With Office of Education help, both in funds and in technical assistance, the experiment was launched. The goal was to develop curriculum models that other school systems could adopt. It also sought to bring needed change into the field of vocational education.

To avoid shaping its models in the insulated environment of the educational system, the Project ABLE research team first went outside the schools to study carefully the employment market in Quincy and the surrounding region.

More than 250 job listings were broken down into clusters, or job families. Researchers visited gas stations and automotive servicing plants, for example, to examine what different employees did. Job clusters were developed for each category, ranging from pump attendant to engine repair mechanic, body repair specialist, and many others.

Eleven general vocational areas were outlined (business education, computer data processing, electro-electronics, foods preparation, general piping, general woodworking, graphic and commercial arts, health occupations, home economics, metals and machines, and power mechanics) and the staff went to work on building and developing the curriculum.

Certain principles guided that development. The curriculum had to be relevant. It had to be individualized. It had to incorporate the latest multimedia and other teaching techniques. It also had to have a strong built-in guidance program.

Work on the project went forward hand-in-hand with the construction of Quincy Vocational-Technical School. Laboratory, shop, and academic space was arranged on the interior so that it all "fitted together." Some facilities, like the large library, were purposely put into the adjoining new building to bring students of the new school and academic Quincy High next door closer together, thus breaking down the traditional separation between students who attend vocational and academic schools. As then superintendent and principal planner Pruitt explains, "we built an upper story bridge between the two buildings to symbolize the merging of the academic and vocational secondary schools."

The Project ABLE staff focused on three areas — power mechanics, electro-electronics, and general woodworking. The guidance unit was also developed. Then step by step, through painstaking testing of techniques and materials, the new curriculums took shape. The power mechanics course was the first in the ABLE series to be completed.

The course was tested and is still in use at Quincy Vocational-Technical School. The shop area is spacious, well lighted, with a concrete floor. There are engine mounts and other mechanical mockups. One or more cars are always inside the shop for instructional uses. Under the curriculum, about the 1st week is devoted to an intensive orientation. In give-and-take sessions with the teacher, the students learn about what they'll be doing for the year.

After that is over, the student makes the choice of what he wants to do. There are study units on safety, hand tools, automotive hardware, customer service and sales, bulb circuits and fuses, spark plugs, tire inspection, batteries, lubrication, thermostats, and so on. The units are arranged so that they gradually draw the student deeper into the subject matter.

The stress in the classroom is always on personal achievement, according to teacher Thomas Walsh. Students are thus, at their own speed, able to get "a good handle on the subject."

As a student finishes a study unit, he's checked out individually by his teacher. If he passes, he posts his advance by hanging a chip

beside his name on the bulletin board. The line of chips grows as he moves from unit to unit. When the student completes the work of a course, he's free to move along at that point to another course of his choosing.

Althugh the Project ABLE curriculums are designed so they may be used in any high school year, the power mechanics course has most generally been adopted in the 10th grade, the electro-electronics course in the 11th and 12th grades, and the general woodworking course in the 10th grade.

The Vocational Education Department of the Quincy schools, headquartered at 70 Coddington Street, reports that many school districts around the country have expressed an interest in the ABLE program. Some have already moved to introduce the courses into their own vocational schools. Vocational schools in Philadelphia and Baltimore, for example, are using the power mechanics segment with disadvantaged students.

Quincy's Vocational-Technical High School, meanwhile, remains a mecca for visiting educators. It is a working laboratory and demonstration center for a new look in vocational education initiated under the OE-sponsored Project ABLE.

Can the technical and vocational education systems used in training military personnel in the U.S. Armed Forces be transferred to civilian schools?

How effective would they prove? Would they be accepted by the students?

With the military leaning heavily on audio-visual techniques and programed instruction, would switching a technical course to a public school classroom mean a big investment in equipment for the civilian school?

Could the average high school, postsecondary technical school, or college vocational instructor adapt to the military approach to education, even in technical areas?

These were just a few of the questions that officials of the Office of Education and vocational-technical educators from military and civilian life sought answers to in launching the Utah project, an 18-month experiment designed to determine whether U.S. Air Force courses and teaching materials could be used in the Utah State public school system.

The Aerospace Education Foundation, 1717 Pennsylvania Avenue, NW., Washington, D.C., an affiliate of the Air Force Association, was given a grant from the Office of Education to conduct the experiment.

Utah was selected as the laboratory, first, because the presence of a major Air Force installation (Hill Air Force Base) and the burgeoning electronics and technical industry serving it had created a growing demand for skilled technicians, and second, because farsighted Utah educators had already done the spadework for such a project.

"Nothing like this had ever been done before," according to James H. Straubel, who headed the project for the Aerospace Education Foundation.

"There had been scattered borrowing by schools near U.S. military installations in the past. Occasionally, someone from a school close to a base would borrow a film. Or, a teacher from the school might visit the base and sit in on a training class. But there was no organized transfer of information and techniques."

The Utah project got under way in March 1967, when representatives from the State's Division of Vocational and Technical Education met with representatives of the State's Air Force Association and the Foundation's Educational Technology Advisory Committee. Using a 10-year projection of manpower needs in Utah, the group determined there were certain job priority areas—electronics, medical technician, and aircraft maintenance. The Air Force representatives, reviewing their training programs in these areas, came up with 19 courses. Out of these, the Utah educators selected three—electronics principles, aircraft mechanics, and medical service specialist (or nurse's aide). Then the nuts-and-bolts job of making the actual course transfers began.

Certain schools in the State system were selected for the test. Informal meetings and workshops were held at these schools with the teachers who would be taking part, and the teachers visited the Air Force bases where the courses were taught.

Don James, an instructor in electronics at Utah Technical College, a postsecondary technical school at Provo, is one of three teachers who visited Lowry Air Force Base near Denver, Colo., to take a first-hand look at the electronics course.

"We spent a week there sitting in on classes, reviewing films, and meeting with the military instructors," he says. "It was quite an experience and it opened our eyes to some new techniques in education. We felt there were parts of the course that wouldn't quite do for us, but we finally decided to take the whole package."

Three Air Force courses were finally selected and scheduled for testing:

- A 90-hour segment from the Air Force standardized electronics principles course, to be tested at Weber State College at Ogden; Dixie College at St. George; Utah Technical College at its Provo and Salt Lake City campuses; and Jordan High School in Salt Lake City.
- A 60-hour segment of the Air Force aircraft mechanics course, to be tested at Utah State University at Logan.
- A 20-hour segment from the Air Force medical service specialist course (nurse's aide) to be tested at Utah Technical College in Salt Lake City.

The new courses were not simply dropped into the curriculums at the test schools. The experiment was set up so that a conventional

course and a modified course, which was an Air Force conventional course mix, were taught parallel to the straight Air Force course.

The design of the experiment varied with each course. About 250 students, the total enrollment in basic electronics at five schools ranging from high school to college, were involved in the electronics portion. The three test groups were established. The modified group, essentially, received extra math and laboratory work.

Only Utah State University was involved in the aircraft mechanics course, and the two test groups alternated between conventional and Air Force instruction. Tests were given to the students at various stages to measure learning.

For the nurse's aide test, one group received the Air Force instruction while the other got the conventional instruction.

It became clear as the experiment got under way that the military and civilian instruction were marching to different drummers.

The Air Force approach to the teaching of all three courses was performance oriented, unlike its civilian counterpart.

Given a specific amount of instructional input, for instance, the Air Force demanded an equivalent performance level from its students. If the course was designed to train aircraft maintenance mechanics, then the Air Force expected to produce an aircraft maintenance mechanic at the end of a specific period of instruction.

The approach to the same subjects in the civilian schools tended to be more loosely organized. Less attention was given to specific objectives. The Air Force course in electronics could qualify a student for a job as a basic technician in industry. The same student going through a conventional electronics course, however, would come out with nebulous skills, and he would require retraining before he could do the same job.

The Air Force courses, in addition, leaned heavily on audiovisual aids and programed instruction. Much of the instruction consisted of films that led the student through the course materials in easy-to-understand stages. Each film ran between 10 and 40 minutes. During pauses on the screen, the instructor in the film had the students answer questions on a predistributed study guide. Students also used laboratory manuals that were an extension of the filmed lessons.

For the civilian teachers, it was a whole new approach. It altered their role in the classroom. Most quickly adapted to the changes but a few, admittedly, had difficulty and said they preferred the old ways better.

"It speeded up the teaching process tremendously," states Mr. James. "It was great for new teachers, especially. It gave them a concrete lesson plan and it provided a simplified approach to complex subjects."

Leon De Varies, who teaches electronics at Cyprus High School in Salt Lake City, says the Air Force materials have been "invaluable" in his own teaching.

"Basics are basics in electronics, and that's what the students get from the Air Force materials. At first, the kids were bothered by the pauses and the repetition in the films. But they got the point and accepted it after I explained the reasons behind it."

He adds that introducing the Air Force course in electronics didn't involve any extra expenses for the school.

"The school district already had the films. I found an old movie projector the school had hidden in a storage closet and set it up in a small room next to the shop. The boys go in there to see the films. If one of the boys has missed something, he can go into the room by himself, switch on the projector, and review what he's missed."

The vocational instructor, whose electronics course runs for 2 hours, says that having the student put answers on a piece of paper while he's watching the film, as required in the Air Force course, "reinforces the lesson for the student."

Other teachers agree. "My students can hear an explanation a dozen times," observes one teacher, "but it doesn't really sink in until they put it down on paper."

Jordan High School found that a 1-hour electronics course using Air Force materials just wasn't enough time to reach and hold the student, and subsequently dropped the course.

Mrs. Margaret Nelson, a nursing instructor at Utah Technical College, describes the Air

Force materials for teaching the nurse's aide course as "beautiful." She adds that it "introduced us to how effective programed instruction could be, and we've gone over to it in part." Since the test was conducted, however, and partially as a result of it, the college has shortened its nurse's aide course even more. The training time was reduced to help meet a growing shortage of nurses in the State.

That the Air Force courses could be adapted with good educational results in civilian high schools, postsecondary technical schools, and colleges was demonstrated in the Utah project. An independent evaluation of the project shows that students enrolled in the Air Force courses generally score slightly higher than the students in the conventional courses and they also retain the information longer.

The teachers involved in the project invariably are enthusiastic about the Air Force instructional methods and learning materials. As one teacher sums it up, "It got results. The students learned." Most of the teachers, at the same time, insisted on adapting the materials in their own way. One teacher added extra increments of mathematics to the electronics course, for example. Another assigned his students additional laboratory projects that were related to the filmed Air Force teaching. Another made up his own worksheets for students to use while they were viewing a film. Essentially, however, the core of the course was that of the Air Force.

The Utah Division of Vocational and Technical Education has taken over funding of the program since the experiment was completed. It is now working to introduce other Air Force instructional units into the State's public school system. In the field of electronics alone, new course units totaling 450 hours have been accepted for use from the Air Force. These include units on D.C. circuits, A.C. circuits, solid state devices, vacuum tubes, oscillators, receiver principles, servo-mechanisms, wave shaping circuits, and microwave principles. The A.C. and D.C. units are being introduced into high schools and the balance will go into postsecondary schools and colleges.

"The Air Force materials could easily be used by other school systems around the country, but it would be important to adapt them to local job market conditions," says Mr. Straubel of the Aerospace Education Foundation. "The Air Force courses would be a basic curriculum package—a starting point. Then local educators, manpower specialists, and local industry representatives could review the package and utilize it to meet the long range employment needs for their particular area."

The Aerospace Education Foundation, meanwhile, is looking to the future and anticipates requests from other civilian school systems for its courses. It is making a complete inventory of courses now being used by the Air Force. Of these, about 100 course units are seen as being potentially transferable to civilian schools. The subject categories include data processing, clerk-administration, health occupations, transportation, auto mechanics, machinist, radio communication, and others.

Thus, it appears that the greatest impact of the Utah project still lies in the future. For the Office of Education the experiment was one more contribution that its sponsored research is making to progress in the Nation's vocational education programs.

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